

Work Order ID 144433

Monday, April 18, 2016 9:17:06 AM

144433

Page 1

Item ID: D412-711-101 Accept ***N900040100*** Setup Start ***NS1***
 Revision ID: URF 16-559 Stop ***NS2***
 Item Name: Replacement Vertical Reference Window
 Start Date: 4/18/2016 Start Qty: 4.00 ***4*** Cust Item ID:
 Required Date: 4/22/2016 Req'd Qty: 4.00 ***4*** Customer:
 Reference:

Approvals: Process Plan: mf Date: 16-4-28 Tooling: _____ Date: _____
 QC: _____ Date: _____ SPC (Y/N): _____ Date: _____
 Run Start ***NR1***
 Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
Draw Nbr	Revision Nbr								
D412-711-101	B U/R / OK <u>16/4/20</u>								<u>MCS 16-04-22</u> <u>3</u>
100	Document Control	0.00							
100									
DC	Memo	0.00							
Doc.Control -USB,or Paperwork	Photocopy bluefiles and create labels for PPP D412-711-101 Change 002								
									DAS 27 9-89 APR 21 2016
110	HAND FINISHING THERMOFORMING	0.00							
110									
HandThermo	Memo	1.44							
Hand Finishing Thermoforming	Set up Machine as per folio FTA 077 and D711W program using mould DT9640								4 16/04/19
120	HAND FINISHING THERMOFORMING	0.00							
120									
HandThermo	Memo	1.56							
Hand Finishing Thermoforming	Cut Blanks to 37.5" by 43"								4/ 16/04/19

P.T.O.

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____		DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐		AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐					
Date :		Step #:		QTY Effective :			MRB (QSI042) Approval		
Description Work Order Deviation				Disposition				Completed By Lead hand / Supervisor Approval Verification QC / QA Coordinator Approval	
Root Cause		FAULT CATEGORY							
Environment ☐	No Re-verification ☐	Pressure/Forced ☐	Temperature/Cure ☐	Power Loss/Surge ☐	Positioned Wrong ☐				
Design ☐	Operator ☐	Bending ☐	Set-up ☐	Folio/Program ☐	Outside Dimensions ☐				
Doc/Data ☐	Offset/Setup ☐	Centre Not Concentric ☐	BOM/Route ☐	Grain ☐	Over/Under tolerance ☐				
Equip/Tooling ☐	Supplier ☐	Cracks ☐	Broken/Damage/Defect ☐	Weld ☐	Part Incorrect ☐				
Handling/Pre ☐	Training ☐	Crimp/Kink/Ripple/Wave ☐	Inspection Incomplete/Unqualified ☐	Wrong Stock Pulled ☐	Part Lost/Missing ☐				
Material ☐	Use for Testing ☐	Cuffs ☐	Contamination ☐	Out of Sequence ☐	Part Moved ☐				
Internal Transport ☐	Poor Information ☐	Crushing ☐	Countersink ☐	Off-set ☐	Drawing ☐				
Tribal Knowledge ☐	Rushing ☐	Heat Treat ☐	Cut Too Short ☐	Mislabeled ☐	Finish ☐				
LOA ☐	Product Improvement ☐	Wave/Twist in Tube ☐	Instructions Incomplete/Unclear ☐	Fit/Function ☐	Misread ☐				
Substation ☐	Process Improvement ☐	Marks/Chatter ☐	Drill Holes ☐	Misaligned/off center ☐	Turning Sequence ☐				
Past Expiry Date ☐	Manufacturing Process ☐								
Misidentified ☐	Past Due ☐	OTHER : ☐							

144433

Monday, April 18, 2016 9:17:06 AM

Accept

N900040100

Setup Start *NS1*

Stop *NS2*

Stop *NS2*

Start Date: 4/18/2016 **Start Qty:** 4.00 ***4***

Cust Item ID:

Required Date: 4/22/2016 **Req'd Qty:** 4.00 ***1***

Customer:

Reference:

Run Start *NR1*

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____

Stop ***NB2***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
130		0.00							07

130

130

Thermoform

Thermoforming Machine

THERMOFORMING MACHINE

0.00

2.52

Memo

Thermoform as per Dwg. D412-711-101 using DT 9640 and Folio FTA ;
077

Dwg. Rev. B (42)

Folio Rev. C

Visually inspect for proper formation and clarity

Visually and inspect/magic eye

Verified by: 

160

160

HandThermo

Hand Finishing Thermoforming

HAND FINISHING THERMOFORMING

0.00

4.76

Memo

- 1) Trim off excess flange material
- 2) Buff out any light scratches or blemishes
- 3) Etch part number and batch number

3

l

PTO 16/04/19

DAS
07
9-89

3

16/04/20.

DQA:

Date: 16.05.10



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed:

Date: 16/04/09

Work Order update only ☐

Work Order: 144433		DISPOSITION		AGAINST DEPARTMENT/PROCESS					
Part No. D412-711-101		Rework ☐		Skid-tube ☐	Cross tube ☐	Water Jet ☐	Engineering ☐		
NCR No. 16-575C		Scrap ☒		Machining ☐	Small Fab ☐	Prod. Eng. Coord. ☐	Quality ☐		
		Use-as-is ☐		Thermoforming ☒	Finishing ☐	Rec/Store/Packaging ☐	Other ☐		
		Suspected Unapproved ☐		Large Fab ☐	Composite ☐	Supplier ☐			
Date: 16/04/19		Step #: 130		QTY Effective: ①			MRB (QSI042) Approval DAS 12 16/4/20 9-89		
Description Work Order Deviation				Disposition				Completed By DAS 07 16/04/19 9-89	
PART DEFORMED TOO THIN ONE SIDE. FUSE BURNED BETWEEN PARTS 3 & 4.				CHANGE BURNED FUSE THEAT SCRAP 1 PART				Lead hand / Supervisor Approval Verification PD 16.04.21	
Well thickness under tolerance.				Acceptable based on testing, Ref attached email				QC / QA Coordinator Approval PD 16.04.21	
Root Cause				FAULT CATEGORY					
Environment ☐	No Re-verification ☐	Pressure/Forced ☐	☒ Temperature/Cure	☒ Power Loss/Surge	Positioned Wrong ☐				
Design ☐	Operator ☐	Bending ☐	Set-up ☐	Folio/Program ☐	Outside Dimensions ☐				
Doc/Data ☐	Offset/Setup ☐	Centre Not Concentric ☐	BOM/Route ☐	Grain ☐	Over/Under tolerance ☐				
Equip/Tooling ☒	Supplier ☐	Cracks ☐	Broken/Damage/Defect ☐	Weld ☐	Part Incorrect ☐				
Handling/Pre ☐	Training ☐	Crimp/Kink/Ripple/Wave ☐	Inspection Incomplete/Unqualified ☐	Wrong Stock Pulled ☐	Part Lost/Missing ☐				
Material ☐	Use for Testing ☐	Cuffs ☐	Contamination ☐	Out of Sequence ☐	Part Moved ☐				
Internal Transport ☐	Poor Information ☐	Crushing ☐	Countersink ☐	Off-set ☐	Drawing ☐				
Tribal Knowledge ☐	Rushing ☐	Heat Treat ☐	Cut Too Short ☐	Mislabeled ☐	Finish ☐				
LOA ☐	Product Improvement ☐	Wave/Twist in Tube ☐	Instructions Incomplete/Unclear ☐	Fit/Function ☐	Misread ☐				
Substation ☐	Process Improvement ☐	Marks/Chatter ☐	Drill Holes ☐	Misaligned/off center ☐	Turning Sequence ☐				
Past Expiry Date ☐	Manufacturing Process ☐								
Misidentified ☐	Past Due ☐	OTHER: ☐							

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Page 3

Item ID: D412-711-101 Accept ***N900040100*** Setup Start ***NS1***
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Required Date: 4/22/2016 Req'd Qty: 4.00 ***4*** Customer:
Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start ***NR1***
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
170	QC2- Inspect parts off machine FAI/FAIB	0.00							
170									
QC	Memo	0.04							
Quality Control	1) Visually inspect for clarity, and proper formation.								16/04/2016
180	QC5- Inspect part completeness to step on W/O	0.00							
180									
QC	Memo	0.08							
Quality Control	1) Visually inspect for clarity, and proper formation.								16-04-21
185	QC4- 100% Inspect kits for completeness	0.00							
185									
QC	Memo	0.12							
Quality Control									

DAS
21
9-55

APR 25 2016

DQA: _____ Date: _____

**WORK ORDER NON-CONFORMANCE / UPDATE**

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____		DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐		AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐					
Date :		Step #:		QTY Effective :			MRB (QS1042) Approval		
Description Work Order Deviation				Disposition				Completed By Lead hand / Supervisor Approval Verification QC / QA Coordinator Approval	
Root Cause		FAULT CATEGORY							
Environment ☐	☐	No Re-verification ☐	Pressure/Forced ☐	Temperature/Cure ☐	Power Loss/Surge ☐	Positioned Wrong ☐			
Design ☐	☐	Operator ☐	Bending ☐	Set-up ☐	Folio/Program ☐	Outside Dimensions ☐			
Doc/Data ☐	☐	Offset/Setup ☐	Centre Not Concentric ☐	BOM/Route ☐	Grain ☐	Over/Under tolerance ☐			
Equip/Tooling ☐	☐	Supplier ☐	Cracks ☐	Broken/Damage/Defect ☐	Weld ☐	Part Incorrect ☐			
Handling/Pre ☐	☐	Training ☐	Crimp/Kink/Ripple/Wave ☐	Inspection Incomplete/Unqualified ☐	Wrong Stock Pulled ☐	Part Lost/Missing ☐			
Material ☐	☐	Use for Testing ☐	Cuffs ☐	Contamination ☐	Out of Sequence ☐	Part Moved ☐			
Internal Transport ☐	☐	Poor Information ☐	Crushing ☐	Countersink ☐	Off-set ☐	Drawing ☐			
Tribal Knowledge ☐	☐	Rushing ☐	Heat Treat ☐	Cut Too Short ☐	Mislabeled ☐	Finish ☐			
LOA ☐	☐	Product Improvement ☐	Wave/Twist in Tube ☐	Instructions Incomplete/Unclear ☐	Fit/Function ☐	Misread ☐			
Substation ☐	☐	Process Improvement ☐	Marks/Chatter ☐	Drill Holes ☐	Misaligned/off center ☐	Turning Sequence ☐			
Past Expiry Date ☐	☐	Manufacturing Process ☐	OTHER : ☐						
Misidentified ☐	☐	Past Due ☐							

Work Order ID 144433***144433***

Page 4

Monday, April 18, 2016 9:17:06 AM

Item ID: D412-711-101 Accept ***N900040100*** Setup Start ***NS1***
Revision ID: URF 16-559 Stop ***NS2***
Item Name: Replacement Vertical Reference Window
Start Date: 4/18/2016 Start Qty: 4.00 ***4*** Cust Item ID:
Required Date: 4/22/2016 Req'd Qty: 4.00 ***4*** Customer:
Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start ***NR1***
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
190	Identify as per dwg & Stock Location: _____	0.00							
100 Packaging	Memo	0.04							
Packaging	Location : FG099 X2 SOL X1								
200	QC21- Final Inspection - Work Order Release	0.00							
200 QC	Memo	0.40							
Quality Control									

3 **DAS**
27
9-89

APR 21 2016

ML5 **APR 22 2016**

ML5 **APR 22 2016**

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____		DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐		AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐																																																											
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Root Cause		FAULT CATEGORY																																																													
Environment ☐	Design ☐	Doc/Data ☐	Equip/Tooling ☐	Handling/Pre ☐	Material ☐	Internal Transport ☐	Tribal Knowledge ☐	LOA ☐	Substation ☐	Past Expiry Date ☐	Misidentified ☐	No Re-verification ☐	Operator ☐	Offset/Setup ☐	Supplier ☐	Training ☐	Use for Testing ☐	Poor Information ☐	Rushing ☐	Product Improvement ☐	Process Improvement ☐	Manufacturing Process ☐	Past Due ☐	Pressure/Forced ☐	Bending ☐	Centre Not Concentric ☐	Cracks ☐	Crimp/Kink/Ripple/Wave ☐	Cuffs ☐	Crushing ☐	Heat Treat ☐	Wave/Twist in Tube ☐	Marks/Chatter ☐	Temperature/Cure ☐	Set-up ☐	BOM/Route ☐	Broken/Damage/Defect ☐	Inspection Incomplete/Unqualified ☐	Contamination ☐	Countersink ☐	Cut Too Short ☐	Instructions Incomplete/Unclear ☐	Drill Holes ☐	Power Loss/Surge ☐	Folio/Program ☐	Grain ☐	Weld ☐	Wrong Stock Pulled ☐	Out of Sequence ☐	Off-set ☐	Mislabeled ☐	Fit/Function ☐	Misaligned/off center ☐	Positioned Wrong ☐	Outside Dimensions ☐	Over/Under tolerance ☐	Part Incorrect ☐	Part Lost/Missing ☐	Part Moved ☐	Drawing ☐	Finish ☐	Misread ☐	Turning Sequence ☐
																								OTHER : ☐																																							

Picklist Print

Monday, April 18, 2016 9:17:05 AM

Page 1

Work Order ID: 144433

144433

Parent Item: D412-711-101

D412-711-101

Parent Item Name: Replacement Vertical Reference Window

Start Date: 4/18/2016

Required Date: 4/22/2016

Start Qty: 4.00

Required Qty: 4.00

Comments: IPP Rev:A New Issue 06-02-01 JLM
Manufacture in-house 10/06/28 DL

IPP Rev. B.

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
MACRLICS.236		Purchased		No			sf	306.3233		85.33333			DAS 07 9-89
MACRLICS 236										**			

Plexiglass G 0.236"

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
therm	306.3233333	
M132743	66.3233333	
M134103	32	
M134281	144	
M134582	64	

85,333 sg At

DQA: _____ Date: _____

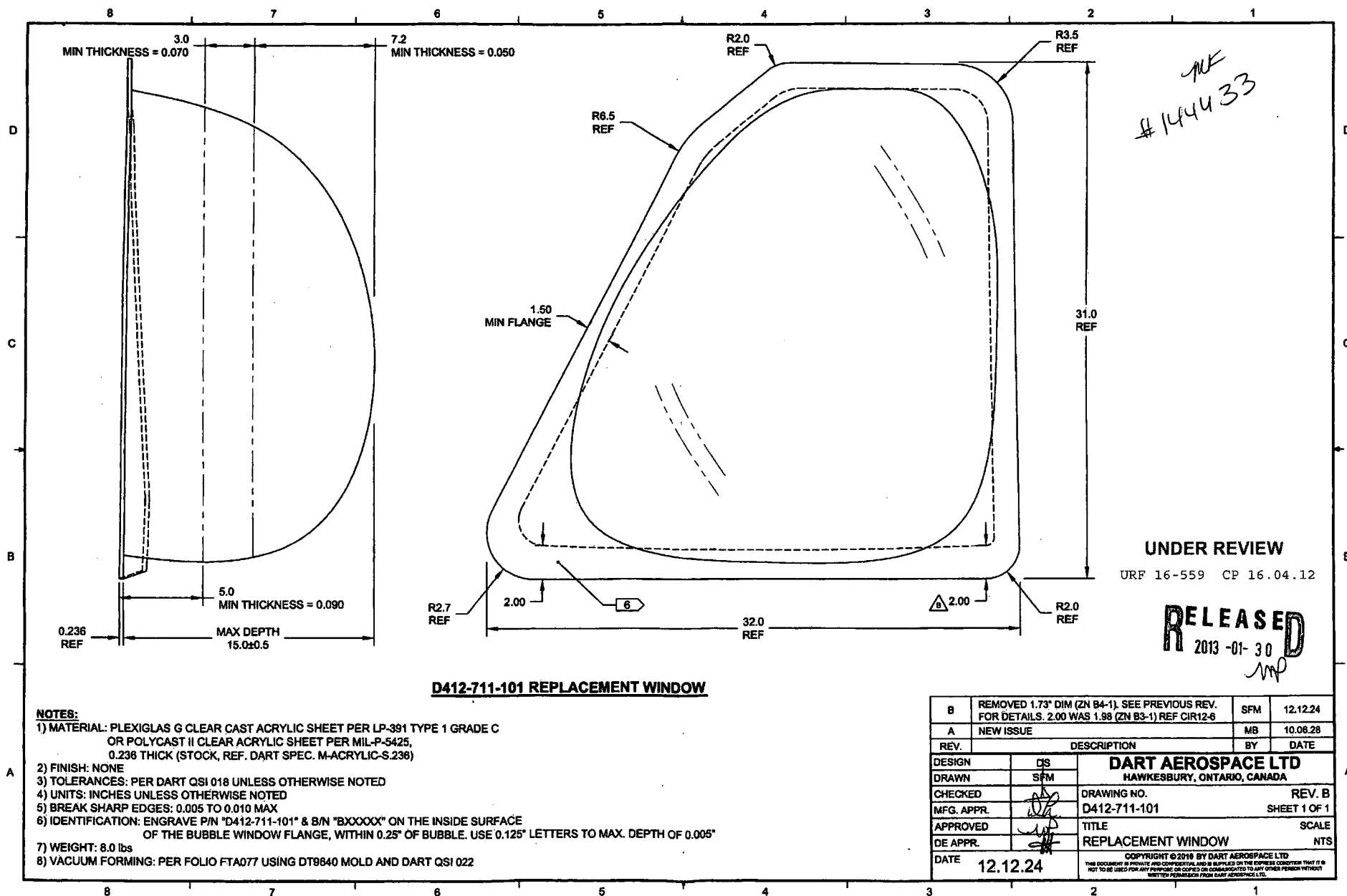


WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____	DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐	AGAINST DEPARTMENT/PROCESS <table style="width:100%; border: none;"> <tr> <td style="border: none;">Skid-tube ☐</td> <td style="border: none;">Cross tube ☐</td> <td style="border: none;">Water Jet ☐</td> <td style="border: none;">Engineering ☐</td> </tr> <tr> <td style="border: none;">Machining ☐</td> <td style="border: none;">Small Fab ☐</td> <td style="border: none;">Prod. Eng. Coord. ☐</td> <td style="border: none;">Quality ☐</td> </tr> <tr> <td style="border: none;">Thermoforming ☐</td> <td style="border: none;">Finishing ☐</td> <td style="border: none;">Rec/Store/Packaging ☐</td> <td style="border: none;">Other ☐</td> </tr> <tr> <td style="border: none;">Large Fab ☐</td> <td style="border: none;">Composite ☐</td> <td style="border: none;">Supplier ☐</td> <td></td> </tr> </table>				Skid-tube ☐	Cross tube ☐	Water Jet ☐	Engineering ☐	Machining ☐	Small Fab ☐	Prod. Eng. Coord. ☐	Quality ☐	Thermoforming ☐	Finishing ☐	Rec/Store/Packaging ☐	Other ☐	Large Fab ☐	Composite ☐	Supplier ☐	
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			QC / QA Coordinator Approval																		
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Environment ☐ Design ☐ Doc/Data ☐ Equip/Tooling ☐ Handling/Pre ☐ Material ☐ Internal Transport ☐ Tribal Knowledge ☐ LOA ☐ Substation ☐ Past Expiry Date ☐ Misidentified ☐	No Re-verification ☐ Operator ☐ Offset/Setup ☐ Supplier ☐ Training ☐ Use for Testing ☐ Poor Information ☐ Rushing ☐ Product Improvement ☐ Process Improvement ☐ Manufacturing Process ☐ Past Due ☐	Pressure/Forced ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Wave/Twist in Tube ☐ Marks/Chatter ☐	Temperature/Cure ☐ Set-up ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Inspection Incomplete/Unqualified ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Instructions Incomplete/Unclear ☐ Drill Holes ☐	Power Loss/Surge ☐ Folio/Program ☐ Grain ☐ Weld ☐ Wrong Stock Pulled ☐ Out of Sequence ☐ Off-set ☐ Misabeled ☐ Fit/Function ☐ Misaligned/off center ☐	Positioned Wrong ☐ Outside Dimensions ☐ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Drawing ☐ Finish ☐ Misread ☐ Turning Sequence ☐																
OTHER : ☐																					



DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____	DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐	AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐			
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Description Work Order Deviation		Disposition			
				Completed By	
				Lead hand / Supervisor Approval Verification	
				QC / QA Coordinator Approval	
Root Cause Environment ☐ Design ☐ Doc/Data ☐ Equip/Tooling ☐ Handling/Pre ☐ Material ☐ Internal Transport ☐ Tribal Knowledge ☐ LOA ☐ Substation ☐ Past Expiry Date ☐ Misidentified ☐ No Re-verification ☐ Operator ☐ Offset/Setup ☐ Supplier ☐ Training ☐ Use for Testing ☐ Poor Information ☐ Rushing ☐ Product Improvement ☐ Process Improvement ☐ Manufacturing Process ☐ Past Due ☐		FAULT CATEGORY Pressure/Forced ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Wave/Twist in Tube ☐ Marks/Chatter ☐ Temperature/Cure ☐ Set-up ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Inspection Incomplete/Unqualified ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Instructions Incomplete/Unclear ☐ Drill Holes ☐ Power Loss/Surge ☐ Folio/Program ☐ Grain ☐ Weld ☐ Wrong Stock Pulled ☐ Out of Sequence ☐ Off-set ☐ Mislabelled ☐ Fit/Function ☐ Misaligned/off center ☐ Positioned Wrong ☐ Outside Dimensions ☐ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Drawing ☐ Finish ☐ Misread ☐ Turning Sequence ☐			
OTHER : ☐					

Daryl Leger

From: Chris Provencal
Sent: Wednesday, April 20, 2016 1:06 PM
To: Daryl Leger
Subject: D412-711-101 deviation

From: David Shepherd
Sent: Thursday, April 14, 2016 4:31 PM
To: Chris Provencal <cprovencal@dartaero.com>; William Monterroza <wmonterroza@dartaero.com>
Cc: Patrick Smith <psmith@dartaero.com>
Subject: RE: Message from DART Aerospace Engineering Bizhub C454

Chris,

Thanks for completing the test. As discussed, my only request is that you add the minimum thicknesses listed below to the CIR and get Pat to re-sign. I am OK with you using the results of the test to approve deviations to windows that have just been manufactured so that we can make immediate deliveries to customers. Please try to have the updated TR and drawing to me sometime next week so that this doesn't fall through the cracks.

Regards,
David

From: Chris Provencal
Sent: April-14-16 2:10 PM
To: William Monterroza <wmonterroza@dartaero.com>; David Shepherd <dshepherd@dartaero.com>
Cc: Patrick Smith <psmith@dartaero.com>
Subject: RE: Message from DART Aerospace Engineering Bizhub C454

David,

Further, the min thickness on the tested part, D412-711-101 B144271 was:

0.052" @ 5" height on bottom face (dwg = 0.090")

0.076" @ 5" height on fwd face (dwg = 0.090")

0.046" @ 8" height on bottom face (dwg = 0.070")

0.065" @ 8" height on fwd face (dwg = 0.070")

0.043" @ on top/center (dwg = 0.050")

Chris

From: William Monterroza
Sent: Thursday, April 14, 2016 3:57 PM
To: Chris Provencal <cprovencal@dartaero.com>; David Shepherd <dshepherd@dartaero.com>
Cc: Patrick Smith <psmith@dartaero.com>
Subject: RE: Message from DART Aerospace Engineering Bizhub C454

Good work gentlemen. Thanks for the great effort.

As per David's comments earlier, once David reviews the data and the CIR, we can release the ones Daryl made out of the 0.233" material ahead of the documentation and reports. We will go ahead then and update the drawing to reflect the new minimum thickness as measured on the 0.177" window. What was that dimension by the way. It'd be interesting to know how thin that got with the 0.177" material.

Again, great work – thank you!

Thanks,
Will

Will Monterroza
X 250
M 1 613 677-9898
S dart-wmonterroza

From: Chris Provencal
Sent: Thursday, April 14, 2016 3:33 PM
To: David Shepherd <dshepherd@dartaero.com>
Cc: William Monterroza <wmonterroza@dartaero.com>; Patrick Smith <psmith@dartaero.com>
Subject: FW: Message from DART Aerospace Engineering Bizhub C454

David,

We successfully performed the test on the thin D412-711-101 window. The CIR is attached. I put the photos temporarily in:

\\DART-HBY-KAMAN\Engineer\Projects\1 Approved\711-b412-vertrefdoor\Working\TR-D412-711-1 Rev B photos

The loads are as follows:

Table 2 – Test Results for D412-711-101 Replacement Window

Direction	Limit/Ultimate	Req'd Load	Actual Load	Notes
Outboard	Limit	423 lb	437 lb	No permanent deformation.
Outboard	Ultimate	635 lb	656 lb	No failure.
Inboard	Limit	46 lb	65 lb	No permanent deformation.
Inboard	Ultimate	68 lb	84 lb	No failure.
Drag	Limit	484 lb	486 lb	No permanent deformation
Drag	Ultimate	725 lb	726 lb	No failure
Down	Limit	112 lb	124.5 lb	No permanent deformation
Down	Ultimate	168 lb	170.5 lb	No failure

For the limit tests, I chose a point on the window and we measured before/after measurements with a square and long ruler. There was no deflection.

The drag load was tricky. We kept the strap close to 7" above the base, which is the center of area according to AutoCAD. Pat used his foot to keep the strap from sliding up (ref photos). This would be conservative since the weight on the window is the applied load + some of the sandbag weight + some of the foot load. It took several tries to keep

strap at a good height and to keep the load above the test value for 15/3 seconds, with Steve working the come-a-long. We achieved the ultimate load for 3 seconds after several attempts (the one shown in the photo). I wanted another photo showing the load cell in the picture, after a lot more pumping to keep the load above the test value, it cracked. But ultimate was achieved.

Chris

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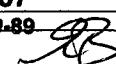
FIRST ARTICLE INSPECTION CHECKLIST
THERMOFORMING SECTION

Description	Accept	Reject	Method of Inspection	Comments
Inside Radii less than <u>N/A</u> "				
Shape Definition	✓			
Texture Retention	✓			
Material imperfections such as bumps, cracks, voids, scratching	✓			

Measured by:	DAS 07 9-89	Date: 16/04/19
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TRIMMING SECTION

Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
Fwd@5" 0.076"	MIN	0.105"	✓			
TOP@5" 0.052"	MIN	0.159"	✓			
AFT@5" 0.052"	MIN	0.127"	✓			
BOTT@5" 0.052"	MIN	0.068"	✓			
Fwd@8" 0.065"	MIN	0.094"	✓			
TOP@8" 0.076"	MIN	0.135"	✓			
AFT@8" 0.076"	MIN	0.112"	✓			
BOTT@8" 0.076"	MIN	0.059"	✓			
APEX 0.043"	MIN	0.070"	✓			
BOTT FLANGE 2.0"	MIN	2.0"	✓			
OTHER FLANGES 1.5"	MIN	1.56"	✓			
APEX DEPTH 15" 4/- 0.5"		15.125"	✓			

Measured by:	DAS 07 9-89	Date: 16/04/20
Audited by:		Date: 16-04-21
Preliminary Approval:		Date:

Rev	Date	Change	Revised by	Approved
B	10.04.14	Added preliminary approval	KJ	

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DART AEROSPACE LTD		Work Order: 144433
Description:		Part Number: D412-711-101
Inspection Dwg: D412-711-101 Rev: B(ur)		Page 1 of 1

FIRST ARTICLE INSPECTION CHECKLIST
THERMOFORMING SECTION

Description	Accept	Reject	Method of Inspection	Comments
Inside Radii less than _____"				
Shape Definition				
Texture Retention				
Material imperfections such as bumps, cracks, voids, scratching				

Measured by:	DAS 07 9-89	Date: 16/04/19
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TRIMMING SECTION

Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
Fwd@5" 0.076"	MIN	0.078"	✓			
TOP@5" 0.052"	MIN	0.116"	✓			
AFT@5" 0.052"	MIN	0.113"	✓			
BOTT@5" 0.052"	MIN	0.118"	✓			
Fwd@8" 0.065"	MIN	0.072"	✓			
TOP@8" 0.046"	MIN	0.092"	✓			
AFT@8" 0.046"	MIN	0.105"	✓			
BOTT@8" 0.046"	MIN	0.109"	✓			
APEX 0.043"	MIN	0.064"	✓			
BOTT FLANGE 2.0"	MIN	2.05"	✓			
OTHER FLANGES 1.5"	MIN	1.55"	✓			
APEX DEPTH 15" 4/- 0.5"		15.0"	✓			

Measured by:	DAS 07 9-89	Date: 16/04/20
Audited by:	9B	Date: 16-04-21
Preliminary Approval:		Date:

Rev	Date	Change	Revised by	Approved
B	10.04.14	Added preliminary approval	KJ	

DART AEROSPACE LTD	Work Order: 144433
Description: - - - - -	Part Number: D412-711-101
Inspection Dwg: D412-711-101 Rev: B(ur)	Page 1 of 1

FIRST ARTICLE INSPECTION CHECKLIST
THERMOFORMING SECTION

Description	Accept	Reject	Method of Inspection	Comments
Inside Radii less than <u>N/A</u>				
Shape Definition	✓			
Texture Retention	✓			
Material imperfections such as bumps, cracks, voids, scratching	✓			

Measured by:	DAS 07 9-89	Date: 16/04/19
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TRIMMING SECTION

Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
Fwd@5" 0.076"	MIN	0.089"				
TOP@5" 0.052"	MIN	0.158	✓			
AFT@5" 0.052"	MIN	0.128"	✓			
BOTT@5" 0.052"	MIN	0.079"	✓			
Fwd@8" 0.065"	MIN	0.083"	✓			
TOP@8" 0.046"	MIN	0.157"	✓			
AFT@8" 0.046"	MIN	0.116"	✓			
BOTT@8" 0.046"	MIN	0.073"	✓			
APEX 0.043"	MIN	0.069"	✓			
BOTT FLANGE 2.0"	MIN	2.05"	✓			
OTHER FLANGES 1.5"	MIN	1.55"	✓			
APEX DEPTH 15" +/- 0.5"		15.25"	✓			

Measured by:	DAS 07 9-89	Date: 16/04/20
Audited by:	<i>EB</i>	Date: 16-04-21
Preliminary Approval:		Date:

Rev	Date	Change	Revised by	Approved
B	10.04.14	Added preliminary approval	KJ	